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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,260	11/26/2003	Toyokazu Sakata	TAI 145	6433

23995 7590 07/20/2005

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WASHINGTON, DC 20005

EXAMINER

VINH, LAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 07/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/721,260

Applicant(s)

SAKATA, TOYOKAZU

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 112603.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al (US 2003/0024902 A1)

Li discloses a method for etching low-k dielectric material. The method comprises the steps of:

plasma etching an interlayer insulating comprises low-k film 38 using a gas mixture including C₄F₈/fluorocarbon gas, oxygen and Ar (col 3, paragraph 0023, col 6, paragraph 0047, Table 4), and under a pressure of 60-200 mTorr and a RF power of 50-1000 Watts (col 5, paragraph 0034, 0035); which encompasses the claimed range of 600 Watts or less

The limitations of claims 2, 6 have been discussed above

Regarding claims 3, 7, Li discloses that the low-k dielectric film comprises SOG (col 3, paragraph 0025)

Art Unit: 1765

Regarding claims 4, 9, Li discloses the ratio of oxygen to a combined fluorocarbon gas and oxygen is 5 sccm of oxygen:12 sccm of C₄F₈+5 sccm of oxygen (5 sccm/17 sccm or approximately 29%) (table 4)

Regarding claim 8, Li discloses forming an etch stop layer 36 above the low-k dielectric layer 38 (col 3, paragraph 0023)

3. Claims 10-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsai et al (US 2003/0008511 A1)

Tsai discloses a method for forming a dual-damascene comprises the steps of:

forming a first contact/interconnection 12 (col 2, paragraph 0036)

forming an interlayer low k dielectric layer 16 (SOG) on the contact 12 (col 4, paragraph 0041)

forming a contact hole 31 for electrically connecting the contact 12 and second metal/contact 34, in the layer 16 (fig. 6)

forming a trench/groove for embedding the second metal in the layer 16/interlayer dielectric layer (col 6, paragraph 0056, fig. 4)

plasma etching the contact hole using a gas mixture including C₄F₈, oxygen and argon gas under a pressure of 1.5 mTorr-10 Torr, which encompasses the claimed range of 60 mTorr or higher and RF power output of 500 Watts, which encompasses the claimed range of 600 Watts or less (col 6, paragraph 0055)

The limitations of claims 11-12 have been discussed above

Art Unit: 1765

Regarding claims 13, Tsai discloses forming an etch stop layer 18 formed above the layer 16 (col 6, paragraph 0057)

Regarding claim 14, Tsai discloses the ratio of oxygen to a combined fluorocarbon gas and oxygen is 500 sccm of oxygen :500 sccm of C₄F₈+500 sccm of oxygen (500 sccm:1000 sccm or approximately 50%) (col 5, paragraph 0046)

Regarding claim 15, Tsai discloses plasma etching the contact hole and trench using a gas mixture including C₄F₈, oxygen and argon gas under a pressure of 1.5 mTorr-10 Torr, which encompasses the claimed range of 60 mTorr or higher and RF power output of 500 Watts, which encompasses the claimed range of 600 Watts or less (col 6, paragraph 0054, 0055)

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1765

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'LV' followed by a stylized flourish.

LV

July 19, 2005